

CLAIMS

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1. A color image-forming medium comprising:  
a substrate; and  
5 a color-developing layer coated on said substrate,  
wherein said color-developing layer is composed of at least  
one kind of heat-sensitive color-developing component, and a  
plurality of pressure-sensitive microcapsules uniformly  
distributed therein;

10 each of said pressure-sensitive microcapsules is filled  
with a dye exhibiting a first single-color, and features a  
pressure/temperature characteristic to be broken when being  
subjected to a predetermined pressure within a first temperature  
range; and

15 said heat-sensitive color-developing component features a  
thermal color-developing characteristic to develop a second single  
color within a second temperature range defined by a first critical  
temperature and a second temperature, said first critical  
temperature being in said first temperature range, said second  
20 critical temperature exceeding an upper limit temperature of said  
first temperature range.

2. A color image-forming medium as set forth in claim 1,  
wherein a temperature range between the first critical temperature  
of said second temperature range and the upper limit temperature  
25 of said first temperature range is defined as a color developing

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range in which both said first single color and said second single color are developed.

3. A color image-forming medium as set forth in claim 1, wherein a temperature range between the upper limit temperature 5 of said first temperature range and the second critical temperature of said second temperature range is defined as a color developing range in which only said second single color is developed.

4. A color image-forming medium as set forth in claim 1, wherein an extent of said first temperature range is regulated by 10 varying at least one parameter selected from the group consisting of a thickness of the color-developing layer, an amount of filler contained in the color-developing layer, an average diameter of the pressure-sensitive microcapsules, a material of the substrate, a shell wall strength of the pressure-sensitive microcapsules and 15 a surface roughness of the substrate.

5. A color image-forming medium as set forth in claim 1, wherein a lower limit temperature of said first temperature range is set as a temperature of less than 100°C.

6. A color image-forming medium as set forth in claim 1, 20 wherein said color developing layer is further composed of another kind of heat-sensitive color-developing component featuring a thermal color-developing characteristic to develop a third single color within a third temperature range more than said second critical temperature.

25  A color image-forming medium as set forth in claim 6,

wherein each of said heat-sensitive color-developing components comprises a leuco-pigment, and said color developing layer is composed of a color developer component for said leuco-pigment.

8. A color image-forming medium as set forth in claim 7,  
5 wherein said first temperature is defined as a critical color-developing temperature of the leuco-pigment exhibiting the thermal color developing characteristic defined by said second temperature range, and said second temperature is defined as a critical color-developing temperature of the leuco-pigment exhibiting the thermal  
10 color developing characteristic defined by said third temperature range.

9. A color image-forming medium as set forth in claim 7,  
wherein the leuco-pigment, exhibiting the thermal color developing characteristic defined by said third temperature range, comprises  
15 a black-developing leuco-pigment.

10. A color image-forming medium as set forth in claim 7,  
wherein the dye, encapsulated in said pressure-sensitive microcapsules, is based on a leuco-pigment, and said color developer component is thermally fused when being subjected to at  
20 least a lower limit temperature of said first temperature range.

11. A color image-forming medium as set forth in claim 1,  
wherein said color developing layer is formed as a double-layer structure including a pressure/heat-sensitive color-developing layer containing said pressure-sensitive microcapsules and a heat-  
25 sensitive color-developing layer composed of said heat-sensitive

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color developing component.

12. A color image-forming medium as set forth in claim 11,  
wherein the dye, encapsulated in said pressure-sensitive  
microcapsules, is based on a leuco-pigment, and said pressure/  
heat-sensitive color-developing layer is composed of a color  
developer component for said leuco-pigment, said color developer  
component being thermally fused when being subjected to at least  
a lower limit temperature of said first temperature range.

13. A color image-forming medium as set forth in claim 11,  
wherein said pressure/heat-sensitive color developing layer is  
further composed of another kind of heat-sensitive color-  
developing component featuring a thermal color-developing  
characteristic to develop a third single color within a third  
temperature range more than said second critical temperature.

14. A color image-forming medium as set forth in claim 13,  
wherein each of said heat-sensitive color-developing components  
comprises a leuco-pigment, and each of said pressure/heat-  
sensitive color developing layer and said heat-sensitive color  
developing layer is composed of a color developer component for  
said leuco-pigment.

15. A color image-forming medium as set forth in claim 13,  
wherein said first temperature is defined as a critical color-  
developing temperature of the leuco-pigment contained in the heat-  
sensitive color-developing layer, and said second temperature is  
defined as a critical color-developing temperature of the leuco-

pigment contained in the pressure/heat-sensitive color-developing layer.

16. A color image-forming medium as set forth in claim 14,  
wherein the leuco-pigment contained said pressure/heat-sensitive  
5 color-developing layer comprises a black-developing leuco-  
pigment.

17. A color developing medium comprising:

a substrate; and

a pressure/heat-sensitive color-developing layer coated  
substrate,

10 on said substrate,

wherein said pressure/heat-sensitive color-developing

layer is formed as a binder layer containing a plurality of pressure-sensitive microcapsules uniformly distributed therein;

each of said pressure-sensitive microcapsules is filled

15 with a dye exhibiting a given single-color, and features a

pressure/temperature characteristic to be broken when being subjected to a predetermined pressure within a predetermined temperature range; and

an extent of said temperature range is regulated by varying

20 at least one parameter selected from the group consisting of a thickness of the pressure/heat-sensitive color-developing layer, an amount of filler contained in the pressure/heat-sensitive color-developing layer, an average diameter of the pressure-sensitive microcapsules, a material of the substrate, a shell wall  
25 strength of the pressure-sensitive microcapsules and a surface

roughness of the substrate.

18. A color image-forming medium as set forth in claim 17,  
wherein the dye, encapsulated in said pressure-sensitive  
microcapsules, is based on a leuco-pigment, and said binder layer  
5 is formed as a color developer layer composed of a color developer  
component for said leuco-pigment, said color developer component  
being thermally fused when being subjected to at least a lower limit  
temperature of said temperature range.

TAKAHASHI - HIRANO - KOBAYASHI

A handwritten signature consisting of three stylized names: 'Takahashi', 'Hirano', and 'Kobayashi', written in black ink on a white background.